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1. The Communist revolution in the USSR, following World War I, dispersed what few scientists there were in the country at that time. Some scientific leaders such as Professor E Grishkewich-Trokhymowskyj, Professor C F Bialobrzevskyj, Professor Janitzkij, and Professor Ipatiev, managed to escape abroad, while others such as Professors Armashevskij, Bubnov, and Florinskyj, from the University of Kiev, were executed. Many more were arrested and never heard from again. Following 1921, the Communist regime began rebuilding the depleted Universities and ruined laboratories; faculties of Middle Schools were drawn upon to supply teachers for the Universities. Students, drawn principally from the illiterate masses, were subjected to outside responsibilities of such a nature that they had little time to study, hence gained negligible academic value from their education. During 1937-1938, a great number of Soviet engineers were ordered back to the Universities for refresher courses, due to their obvious lack of training.

2. The most promising University graduates were passed on to the status of "Aspirantures" and were directed into industrial pursuits; due to severe political pressure and surveillance, these found themselves in precarious positions. On the other hand, only the more lethargic Communists among University graduates were willing to accept teaching positions, with the result that the ranks of scientific personnel were filled with incompetence. Of course there were individual exceptions to the above, whose talents were uselessly sacrificed to the various Academies of Science, but these were relatively few.

3. Scientific endeavors in the USSR, prior to 1941, were divided into research on foreign works for incorporation into Soviet industry, and some independent research directed either openly or in a latent form for military purposes. Money was no object in this latter field, and every possible foreign scientific or theoretical paper and book was subscribed to, and translated. Foreign [illegible] machinery was purchased in limited quantities, with the idea of copying and reproducing same in volume in the USSR. The only original Soviet

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technical books of value, in my opinion were:

a. Tekhnicheskaja Enciklopedija, 27 volumes. The first edition contained much pertinent data on resources and technical data in the USSR at that time.

b. Theory of Electrotechnics, by Professor Krug, based chiefly on German developments, the only defect being the last six pages of misprints..

c. Physics of Metals, by Dorfman and Kikojin, a serious reference in the field of metallurgy.

d. Electrodynamics, by Jacob Frenkel.

e. Wave Mechanics, by Jacob Frenkel.

f. Basis of Electric Science, by A.Tamm.

g. New Ideas in the Physics of Atomic Nucleus, by Myssovskyj, covering that field to 1939.

h. Physics and Chemistry of Screening Smokes and Gasses, by Weitzer and Lukirskij.

i. Electronic Semiconductors, by Abram Joffe,

j. Cosmic Rays, by Scobeltzyn.

k. Physical Measurements in Vacuo and Rarified Gasses, by N A Kaptzov.

l. Physical Basis of the Propagation of Short Radio Waves, by Rukhzanskyj, 1934.

Other than the above, only original short articles on numerous insignificant chemistry and physics problems were carried in periodicals.

4. The only scientific journals of any worth prior to World War II were Electrichestvo, which contained translations of foreign works and some original works, and Uspekhi V Phisike and Uspekhi V Khimii. The journals of the Academies of Science contained material, chiefly, of a theoretical nature, and were carefully censored. These were not popular, and although distributed in very limited amounts to the libraries, were always available for interested readers, evidence of wasted potential.

5. Soviet scientists hesitated to print the truth, for fear of reprisals. For [redacted] 50X1

[redacted] 50X1 Many scientists, therefore, took to the mathematical phase of technical problems, which were far from practical at the time. Professor V Fedor Mitkevich modified his writings in the field of electromagnetism after being attacked for his "anti-Marxist" views; Professor Shateleu, of the Leningrad Electrotechnical Institute, and B Vedenskij produced some original works on the theory of electronics, while Professor M A Bonch-Bruevitch did some interesting work on radio problems, the analysis of the cause of atmosphere and its damage on wireless transmission.

6. In 1936, great pressure was exerted on all radio-specialists for work on short wave wireless; this problem was attacked with zeal until one night in 1937 when all those interested radio specialists disappeared; at the Technical University in Kiev, all but two on the radio faculty were removed, [redacted] 50X1 [redacted] such promising young talent interested in this 50X1 field as Kuksenko, Ogievskij, Mzuk, Kijandskij, V Kalinin, A Arenberg, N Petrov,

N Malov and L Kopytin.

7. [redacted]

8. Although the library of the Central Accumulator Laboratory in Leningrad was well stocked with current literature on battery production from abroad, they still could not produce a workable storage battery. The factory's ventilation system was of US design, but the instructions, in English, had been altered, hence the system was useless. Here was an example of not being able to follow simple directions, resulting in inferior products and bad working conditions. At the Saratov Ferro-Nickel Cell factory, the situation was not much better; here storage cells for wireless and automobiles of the Edison positive and Jungner (Cadmium) negative type were being built. Although good in appearance, they had limited life expectancy.

9. A curious exception was that of the Moselement Battery Factory, Moscow, whose production of galvanic battery cells, known as Leclanche dry cells, was good by Western European standards. Moselement until 1941 made cells that were ready for immediate use, filled with electrolyte and active mass; dry cells with active mass and salts inside, but which had to be filled with water before use; cells containing only active mass, the electrolyte supplied seperately and added in before use. This latter variety was the best, had the smallest self discharge, and could be stored endlessly. These cells were principally of Soviet design, although a similar description, with slight variation, could be found in "Primary Batteries", published in London, 1920, by W R Cooper. I would say that Mr G G Morosov and Mr. A I Polizkov were good Soviet specialists in galvanic cell production, who turned out original research work without too much reference to foreign findings.

10. I had the opportunity of studying four volumes of the "Journal of the Central Accumulator Laboratory" in 1940, which contained many short articles describing research on foreign storage and galvanic cells, together with analysis of various oxides and materials used therein. Several articles were devoted to lead powder and its use, and to the description of Curtney's ironclad storage cells. These articles were, in general, openly critical of Soviet battery production practices, and especially against the properties of ammonium-sulfate paste and its application to starter plates since it was felt that ammonium remained in the active mass and passed into nitric acid following charging, thus spoiling the plates. Many of the articles were in favor of abandoning lead-oxides and adopting lead powder instead in storage cells. German research on lead powder was praised, while US lead powder was critized as being of poor quality, lacking in uniformity. Finally the articles were complimentary to the work done on alkali cells at the Saratov battery factory. The open frankness of these articles was a startling revelation to me in a country where censorship was so strict.

11. Uniform quality was lacking in almost every major Soviet industry, based on the inability of management, whose heads were mud led with Marxist ideas, to put successfully into practice what ideas had been stolen from abroad, or even follow the simple directions on the instructions received. Aluminum, for instance, from the Dnieprogess-Zaporozhe

factories, was of good quality, sometimes Al-99.8%. Impurities added later, however, resulted in worthless electric wiring for military use. The same applied in the steel industry, where some medical instruments turned out could be of excellent quality, and the next batch from the same factory as brittle as glass. The Kharkov tractor factory attempted in 1940 to turn out an internal combustion engine patterned after foreign design, but used such soft materials that in a short time the piston rings and cylinders wore out, and compression became impossible.

12. Without the import of rubber, Soviet industry would have come to a standstill, especially in the automotive and aviation fields, for despite propaganda to the effect that the USSR was producing synthetic rubber in such plants as Kok-Sagiz, this was untrue, until 1941 at least. What chemically prepared rubber as was produced, could only be used as a filler for natural rubber imported from abroad; this synthetic material was brittle at temperatures of zero degrees centigrade and soft over 60 degrees centigrade, in short-worthless. 50X1

13. Although the USSR did its best to hide the fact that foreign assistance was responsible for much of the development of Soviet industry prior to World War II, [redacted] for instance, the Kharkov tractor factory was built with US engineering help, as was the Tashkent Hydroelectric Combine, whose energy was later directed to the Fergan Uranium mines. That materials for the Kiev-Electrocentral, as well as the engineers for construction of same, came from Siemenswerke in Germany. That the Germans helped build the Solikamsk chemical combine, and the Swedes helped build the Saratov Alkali Storage Cell Factory. The Svetlana Lamp Factory, a former German concession in Leningrad, put out good incandescent lamps, but went no further into the field of fluorescent lamp production, although detailed descriptive material was on hand from Germany, the US and the UK for such research.

14. Thus we see that until 1941, the majority of all Soviet industrial and scientific research was stolen from abroad, but even in so doing it was not put to its best use, due to lack of training and knowledge on the part of the Soviet scientists engaged in translating these works into actual practice together with the fear and stress of political control and censorship. Present isolation of the USSR will not enhance this position, and despite foreign scientists "induced" to go to the USSR to work, the benefits of their abilities will soon dry up under the same pressure program. This is evident, to me, in their great attempts to make forward strides in the field of atomic energy, and keep abreast of the US. Despite news to the effect that the USSR has exploded a number of atomic bombs, I cannot help but feel that these experimental attempts were accidental and failures as well. The USSR has tremendous, untapped natural resources, it is a giant on clay feet. By continuing isolation of the USSR, that country will never succeed to a scientific equality with the Western World, since its mental background and technical know-how is weak and incompetent, giving little hope to up-and-coming engineers and technicians. Its only hope is its strong intelligence system that can continue to steal the developments of others abroad, but if past history repeats itself, even such theft will never result in practical application within its continental limits.

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